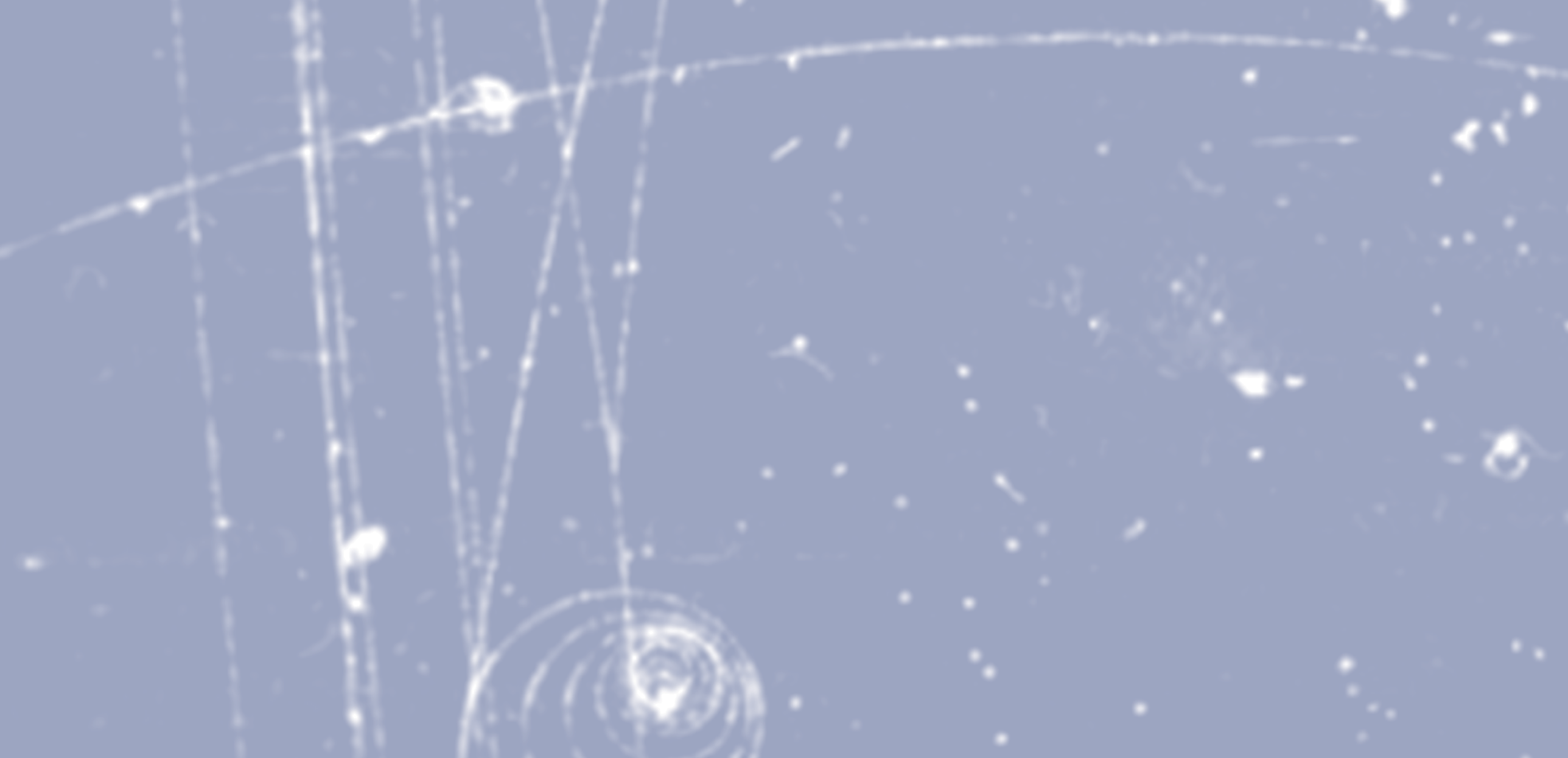

High Energy
LOW VOLTAGE
A Sustainable Campus Vision



High Energy

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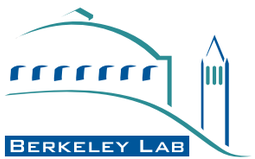
A Sustainable Campus Vision



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Executive Summary

The Lawrence Berkeley National Laboratory (LBNL) currently has an opportunity to redefine its place in the world of science. In addition to its historic identity as a large scale particle-collider research facility, LBNL has a chance to establish global leadership in a new generation of transformative, inter-disciplinary research undertaken in partnership with both universities and private industry. Rather than continuing as a relatively insulated lab site, LBNL has the potential to become the hub of a larger scientific, financial, and political ecosystem. The Vision Plan will guide LBNL in rising to this new role and creating a campus of lasting distinction. Building on the Lab's legacy of brilliant discoveries in a low-key setting, the Vision Plan can be summed up by the phrase *High Energy/Low Voltage*.

It calls for:

- Bringing LBNL into harmony with its cutting edge environmental and energy research with buildings and grounds that set the standard for sustainability;
- Reducing its ecological footprint to allow for the next generation of research facilities while respecting the site's larger ecosystem and extraordinary beauty;
- Bringing together the research community with campus networks and circulation systems that inspire collaboration; and
- Creating a healthy, attractive environment conductive to excellence with life-cycle planning that integrates sustainability at every step.

Why Create a Vision Plan?

The University of California (UC) requested each of its campuses to develop a Vision Plan to guide them in creating places of lasting distinction. These visions express and support the central identity of each site based on its unique:

- research and educational mission,
- economic framework,
- campus culture and traditions,
- regional and community history,
- natural setting and ecology,
- planning legacy,
- architectural style, and
- sense of community.

The LBNL Vision Plan's purpose is to articulate the shared values within which future projects will be realized and help create a distinctive campus, where the whole is greater than the sum of its parts. In particular, the Vision Plan informs the visual language of the campus that conveys its sense of place: the site planning, landscape, urban design, architecture, graphics, and work environments.

This Vision Plan is intended to work in harmony with the 2006 Berkeley Lab Long Range Development Plan (LRDP), which guides physical development over the next 20 years by providing a general land use plan and development framework for the siting of new facilities and infrastructure. It is also supported by the Berkeley Lab Design Guidelines, which guide the implementation of individual projects on the campus, and the upcoming Berkeley Lab Sustainability Policy, because sustainability is at the core of LBNL's new scientific mission.

It started with an idea…
…a vision of tomorrow

Architect Arthur Brown designed the cyclotron building as a monument to science… a landmark extending the University of California campus into the Berkeley hills.

War brought change…
…and an urgent mission

The Manhattan Project became the Lab's priority.

1950
1960
1970

Rapid growth led to an era of astonishing progress. Structures are large and mostly utilitarian.

Big Science

Diversification & Outreach

The Lab diversified into new programs in a variety of fields, requiring new kinds of structures. It also reached out to the larger scientific community with new National User Facilities.

1980
1990

A new direction…
…boldly going green.

Energy efficiency became a theme across multiple disciplines.

This vision plan creates a framework to meet the challenges of the 21st century…

...LBNL tomorrow

The vision for Lawrence Berkeley National Laboratory's future is summed up by this phrase. Building on the Lab's legacy of brilliant discoveries in a low-key setting, the goal remains, as Ernest Lawrence said in 1940, "discoveries of a totally unexpected character and of tremendous importance."

High Energy

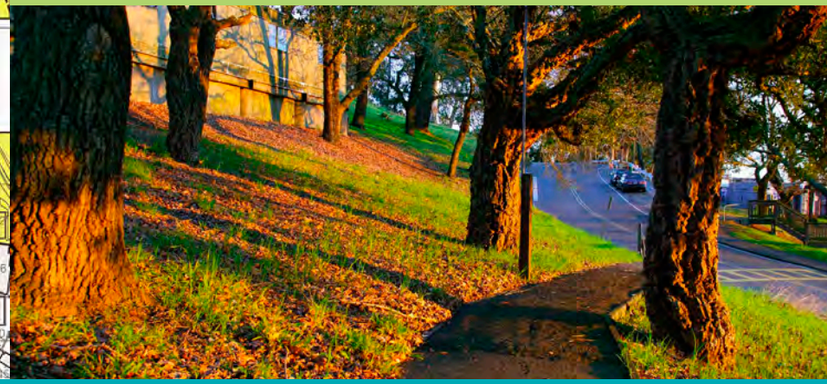
LOW VOLTAGE

Express Global Leadership

Buildings and grounds set the standard for sustainability, bringing LBNL into harmony with its cutting edge environmental and energy research

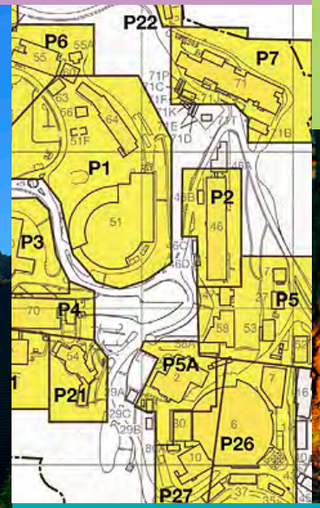
A reduced ecological footprint allows next-generation research facilities, while respecting the site's larger ecosystem and extraordinary beauty

Respect Natural Ecology



Campus networks and circulation systems inspire collaboration, and bring together the research community

Build Networks

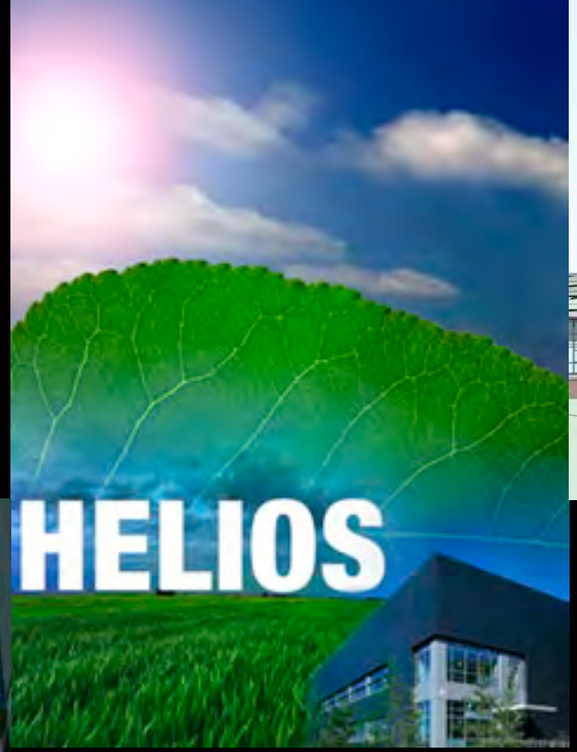


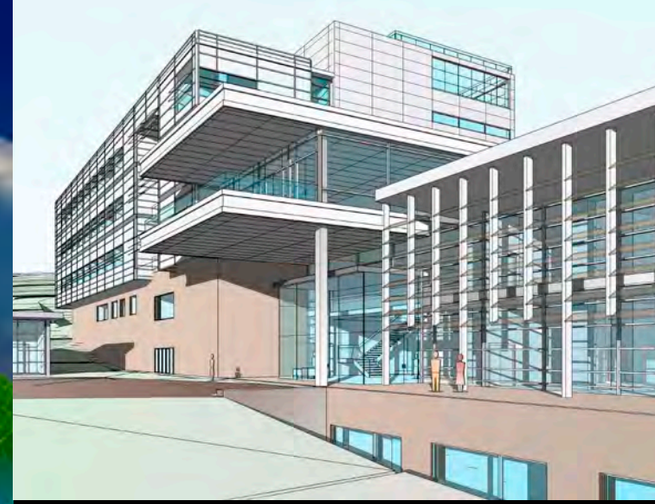
Integrate Life-Cycle

Life-cycle planning integrates sustainability at every step, creating a healthy and attractive environment conductive to excellence

Express Global Leadership

Establish a leadership position in the planning, design, and operation of sustainable buildings and grounds

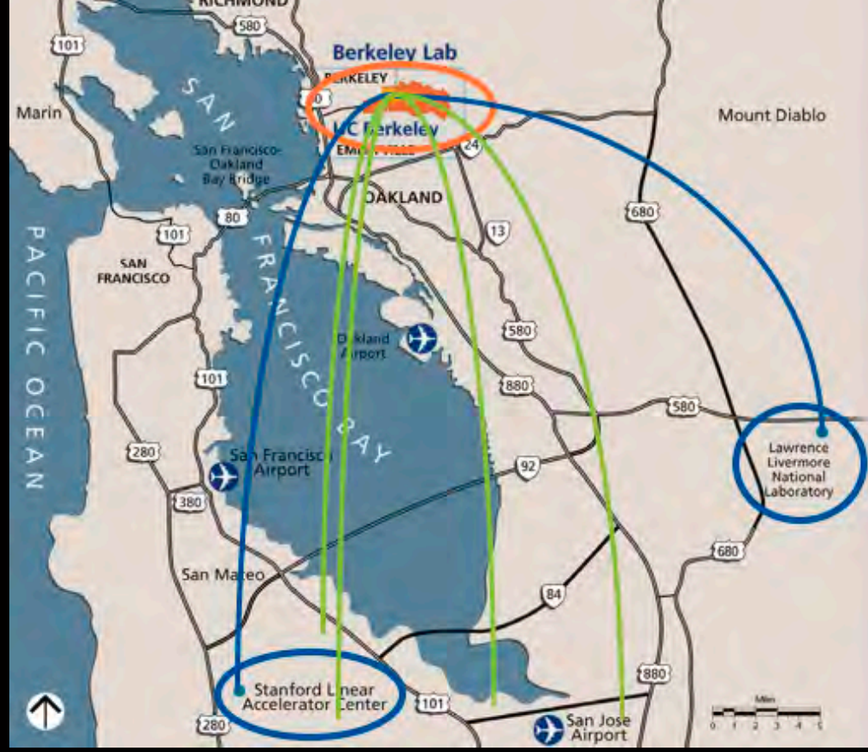




Researchers at LBNL are addressing urgent global challenges that will shape the future of our country, such as strengthening economic competitiveness and building energy independence. As a world leader in transformative research and alternative energy, Berkeley Lab is ideally positioned to establish a leadership position in the planning, design, and operation of sustainable buildings and grounds… starting by bringing its own facilities and site into harmony with its world-class agenda and excellence in research.

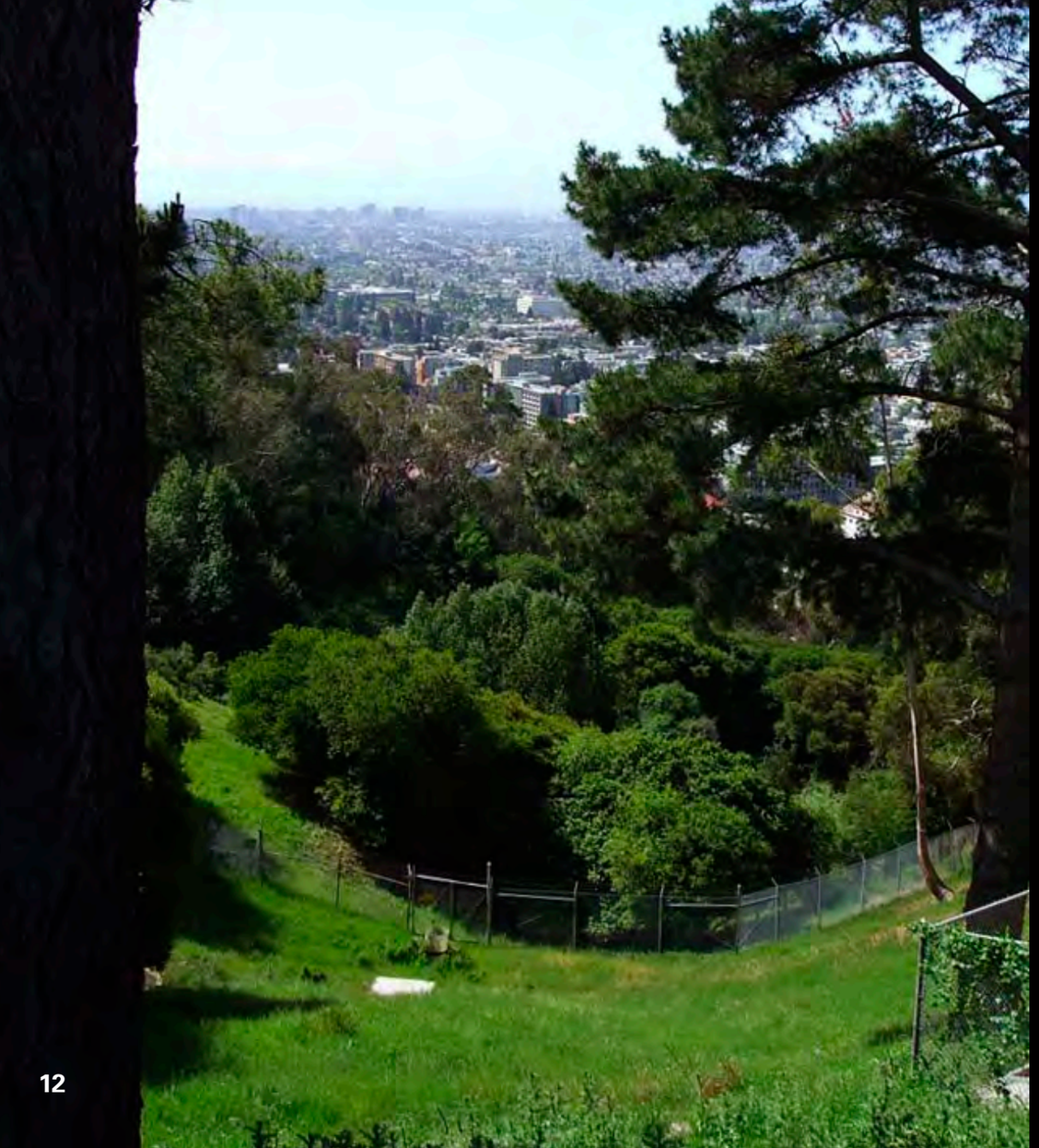
New Funding & Partners

Just as the other UC campuses are designed to recruit top professors and students, the Lab needs to attract and retain the "best and brightest" researchers to maintain the flow of new ideas that fuel our country's prosperity… as well as the funding to support their work. Today, the Lab is also being increasingly called upon to bridge the gap between pure research and downstream applications that will create high-quality jobs and meet our critical energy, environmental, and security needs. This means pursuing new funding sources and partnerships ranging from collaborations with visiting scientists and engineers to alliances with businesses, startups, industries, government, and other universities.



Hub of an Ecosystem

As a result, the Lab's inwardly focused culture is shifting to one of dynamic external interactions. The Lab is transforming into the hub of an ecosystem linking financial, political, and scientific brain power. This touches every aspect of the campus experience from arriving at the gates to finding the way around and engaging productively with its research community. New partners should be welcomed to an attractive, congenial campus with world-class amenities.



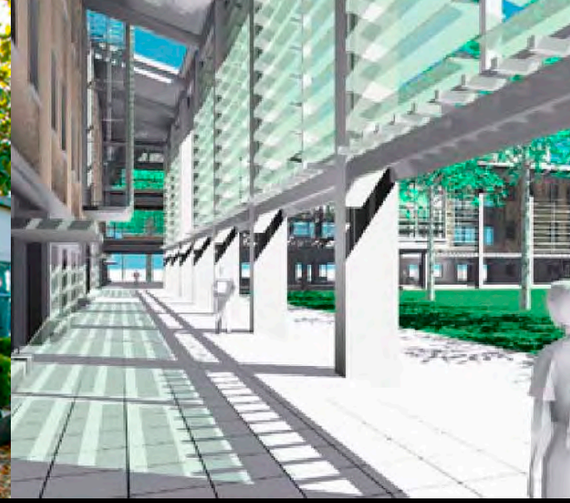
Respect Natural Ecology

Value the site's natural beauty and minimize the ecological footprint

Nestled into softly contoured hills above Berkeley overlooking San Francisco Bay, LBNL occupies one of the most beautiful natural settings of any of the University of California's campuses. In addition to panoramic views across the City of Berkeley to downtown San Francisco and the Golden Gate Bridge, its sunny hillsides and canyons are home to two creeks, over 120 species of animals, and groves of redwoods, eucalyptus, pine, and oak trees.

- **Recovering and recycling energy**
- **Innovating in alternative and renewable sources of energy**
- **Harnessing solar energy**
- **Exploring wind power**
- **Using geothermal heating and cooling**
- **Designing buildings that contribute rather than consume energy**

As well as valuing its own natural resources of topography, soils, solar orientation, wind patterns, vegetation, and habitats, respecting the site's natural beauty and resources means understanding its role in the larger environmental ecosystem, including the SF Bay and watershed area, seismic conditions, and forest protection of adjacent regional parks.



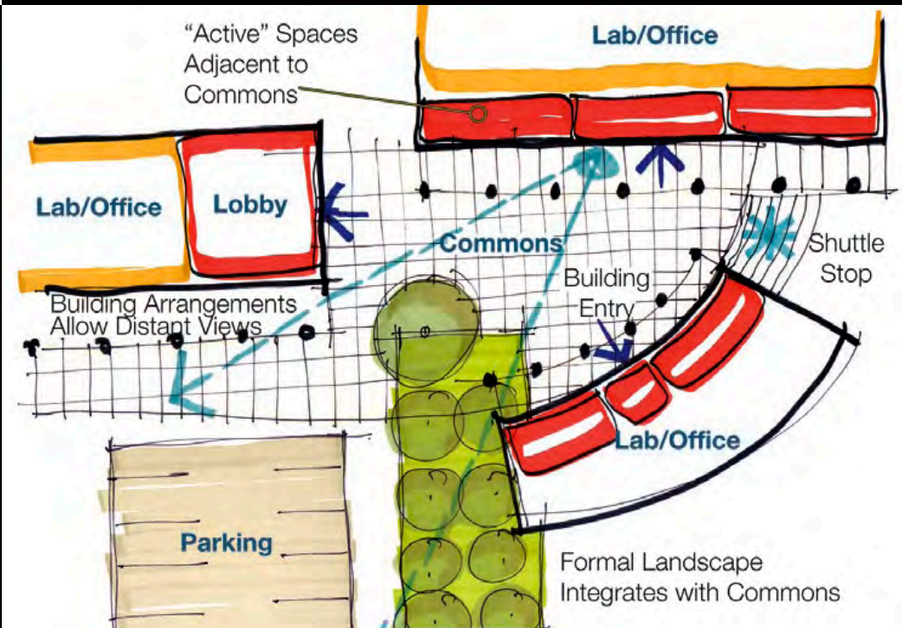
The vision for the future is to value the site's natural beauty and sense of place as a competitive asset — and to minimize the Lab's ecological footprint. This will not be easy given that the few level terraces on the hillside are already occupied by aging facilities and the next generation of science calls for large-scale, interdisciplinary research programs.

Build Networks

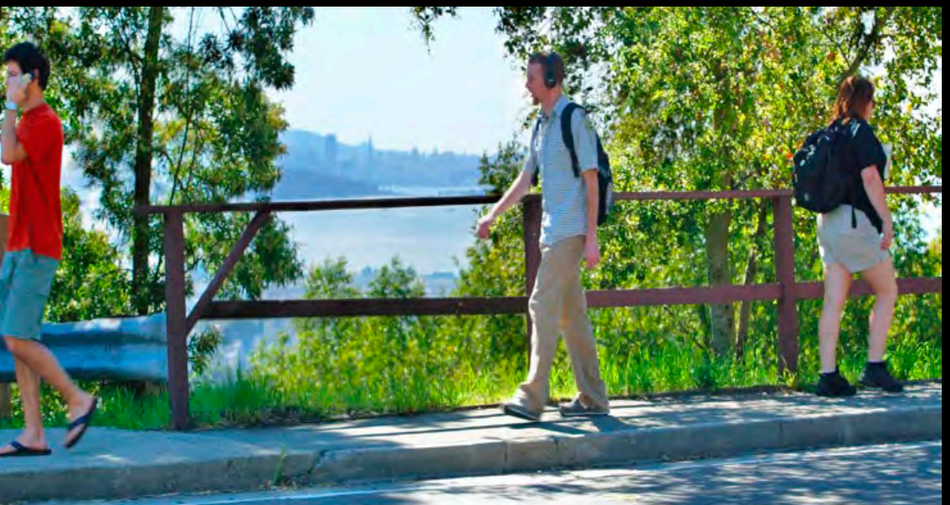
Prioritize the campus' organizing networks, pedestrian connections and alternative transportation

Networking is a crucial component of Berkeley Lab's future scientific excellence. In "Rising above the Gathering Storm", the National Academy of Sciences, National Academy of Engineering, and Institute of Medicine conclude that, "The most significant new scientific and engineering advances are formed to cut across several disciplines."

- **establish sustainable growth patterns**
- **reduce infrastructure investments and construction impacts**
- **increase densities on selected sites**
- **respect water systems with storm water management**



LBNL was founded on a culture of teamwork. Today, it has become the most intellectually diverse of the US Department of Energy's national laboratories. The important role of inspiring cross-disciplinary collaboration and participation in a larger scientific community will be nurtured by the campus' networks, such as its sequence of landscaped open spaces, its overlapping, multi-centric land-use patterns, its Commons and other shared services, and its circulation systems. Therefore, the Vision Plan prioritizes the campus' organizing networks, pedestrian connections and alternative transportation. In addition to the current shuttle system and future structured parking facilities proposed by the LRDP, the Vision Plan emphasizes:



Shared Transportation

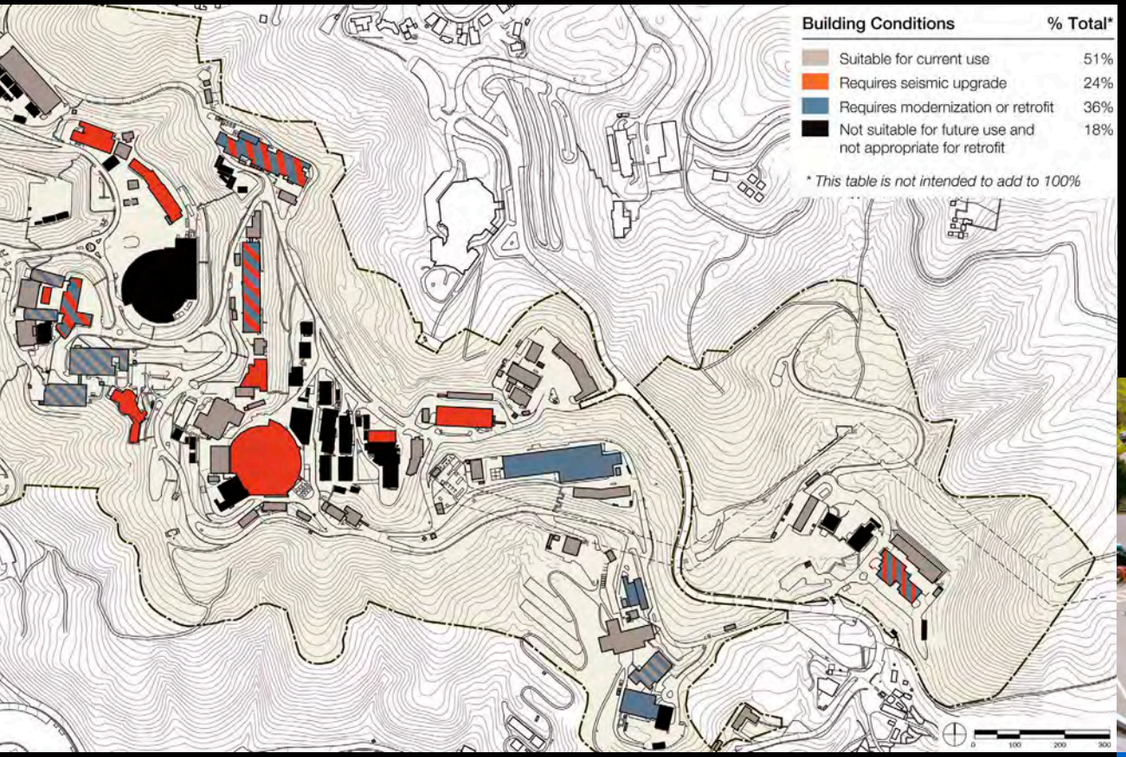
- Offer incentives for car pooling, such as a "fast lane" at the front gates
- Offer free campus bikes to pick up and drop off

Alternative Transportation

- Continue to improve the shuttle bus and biking
- Explore the proposed light rail connection with UCB and Berkeley

Pedestrian Connections

- Upgrade the system of organic walkways and steps, especially to connect with UC Berkeley's campus
- Encourage walking to and from the Commons
- Provide pedestrian-only zones



Integrate Life-Cycle Planning

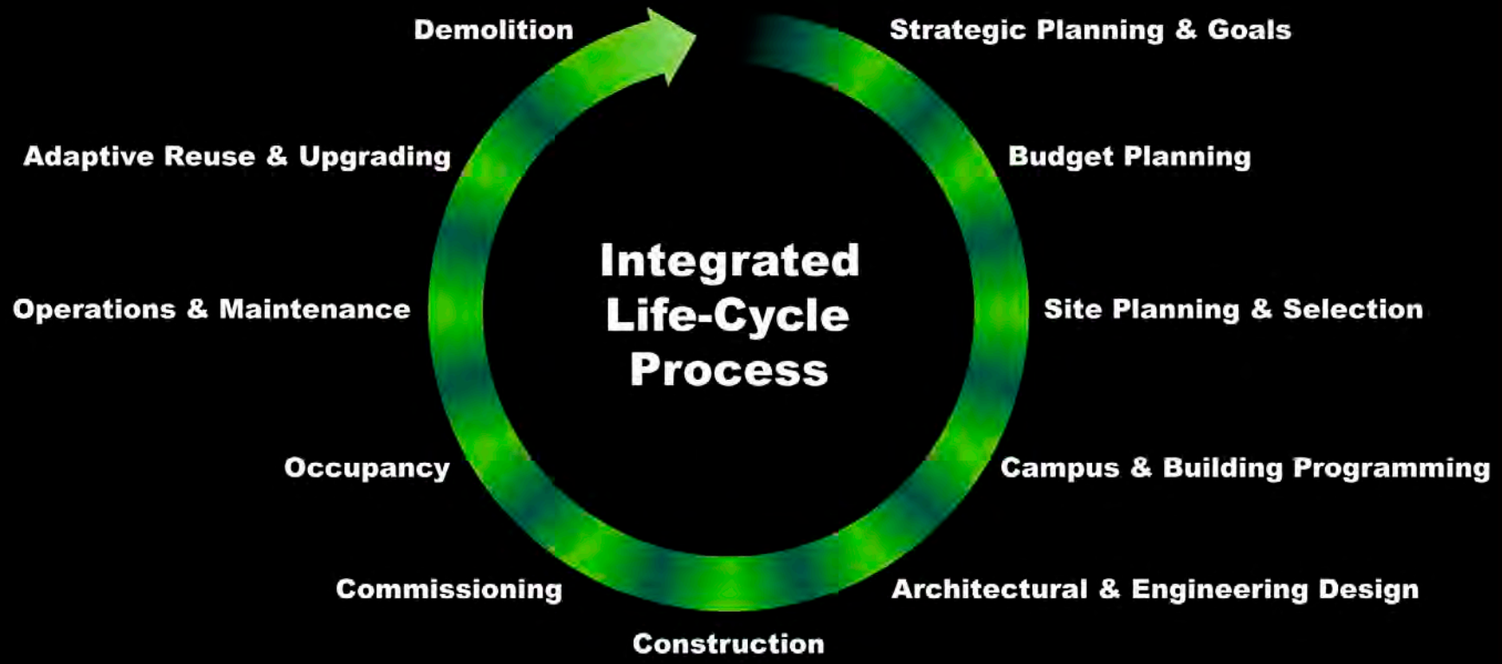
Create an integrated process for the planning, design, and operation of the Lab's campus.

Creating an integrated process for the planning, design, and operation of the Lab's campus and its buildings is probably the most important part of the Vision Plan. None of the other parts of the vision can be achieved without it.

Today LBNL's planning process is complicated by differing land versus building ownerships. While the land is owned and managed by the University of California, the buildings were built to respond to individual research programs and are owned mostly by the US Department of Energy, which leases the underlying parcel from the University. This has fragmented the property into 28 unrelated parcels, created awkward juxtapositions of unrelated facilities, duplicated road and infrastructure investments, and disrupted the campus' sense of continuity and community.

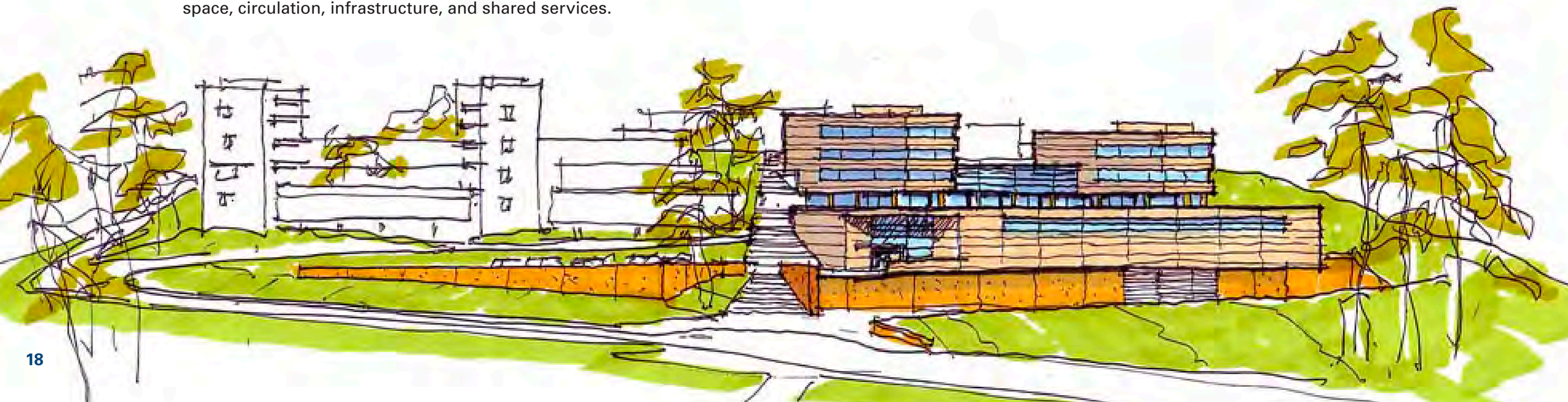
Integrated Life-Cycle Process

An integrated life-cycle process will create a circle of sustainability. The process begins with strategic planning for the property, so that the whole is greater than the sum of its parts. This is based on budget planning that includes funds for stewardship of the land and its resources as a dedicated line item of every building project and lease agreement. Site planning, infrastructure decisions, and site selection evolve out of the strategic plan and budget. Campus and building programming will take place together so that shared services are not duplicated and buildings respect designated common spaces and research clusters. Architecture & engineering design is grounded within its larger context. Construction costs and impacts are reduced — with less disruption to scientists. Commissioning ensures the energy efficiency and functioning of the systems. Occupancy takes place in an efficient way, reducing redundant costs of facilities. Operations and maintenance protect the investment and minimize life-cycle costs. Adaptive reuse and upgrading take place in a sustainable cycle, allowing for selective demolition where warranted for new programs to begin.

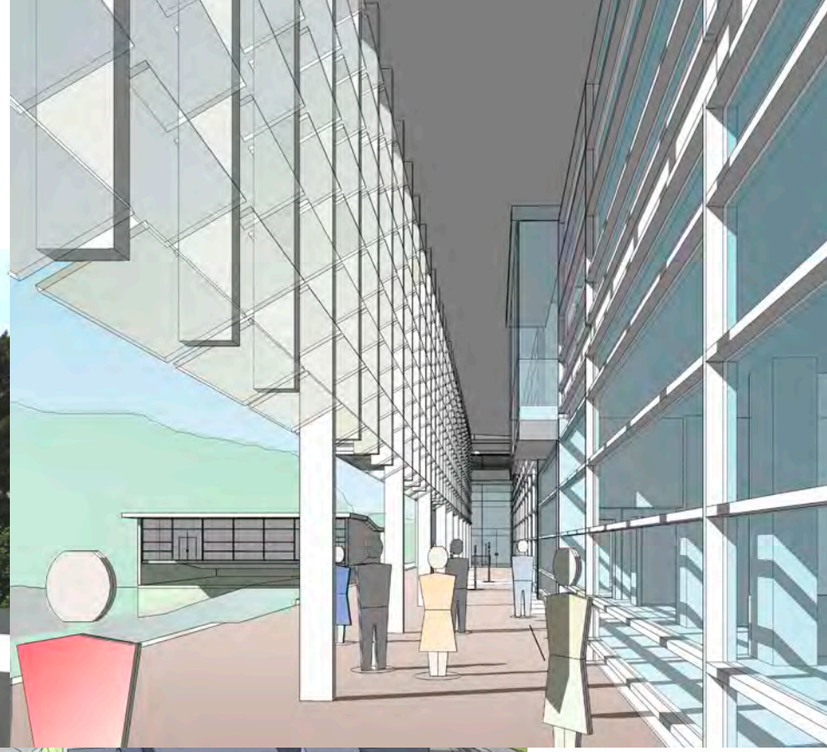


Implementing the Vision

Our vision is that these changes will take place in an evolutionary, not revolutionary, way, building on the strengths of Berkeley Lab now. But there are both short-term and long-term actions that can be set in motion today. For starters, the upcoming building projects for the Helios/Energy Biosciences Institute (EBI) and Computational Research & Theory (CRT) facilities will become models of sustainability. A strategic planning department should be organized and tasked with developing the details of the Vision Plan for LBNL's long-term sustainability. Lease arrangements and documents should start to be revised immediately in time for budget calculations on the next research grant proposal. Site planning can begin to develop a master plan for open space, circulation, infrastructure, and shared services.



A campus in transition creates multiple opportunities for reuse and redevelopment. Here are some examples:



Tomorrow

High Energy

LOW VOLTAGE

To summarize our vision for the Lab, we look forward to global leadership not only in our high-powered research, but also in our own buildings and grounds. We will set new standards for sustainability while also protecting the low-voltage beauty of our extraordinary natural setting, strengthening the bonds that make us a collaborative community, and revitalizing the life-cycle that keeps our plans on course.

The Berkeley Lab campus will reflect its heritage of excellence, and its scientific focus on the great 21st century issues of energy and environment.

Acknowledgments

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